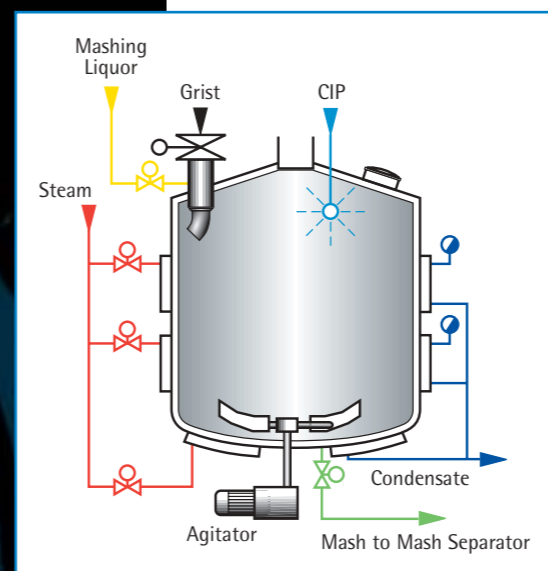
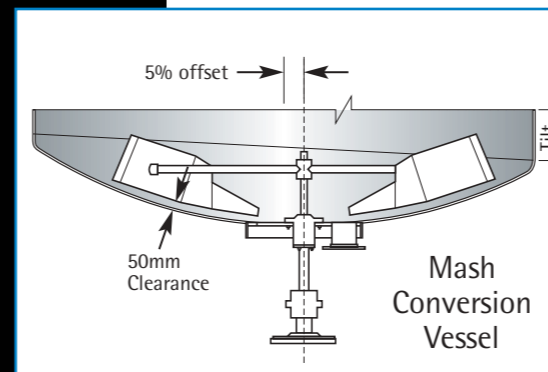


Mash Conversion

excellence achieved through control of four key parameters



1. Low Shear Agitation

Vessel Shape

- Low aspect ratio (height:diameter) 0.6:1
- Tilted dish
- No internal baffles

Agitator

- Large - 85% of vessel diameter
- Slow - max. tip speed 3.8 to 4.0 m/s
- Off centre - 5% of diameter
- Variable speed - optimises performance
- Swept surfaces to avoid burn-on

Mash Transfer

- Pipework low velocity (<1.5 m/s)
- No severe directional changes
- Long radius bends
- Mash transfer pump has open impeller and slow speed - less than 1000 rpm

Benefits of the Briggs Approach

- No 'balling'
- No mash degradation
- Excellent heat transfer
- Minimised oxygen pick-up
- No burn-on
- Homogenous mix - low colloidal buffer/shear

2. Accurate Mash Temperature Control

- Independent heating zones are provided to accommodate varying mash volumes and heat-up rates
- Burn-on is prevented because a steam jacket can only operate when fully covered by mash
- Soft-start steam feature allows condensate purging and prevents jacket over-stress
- Automatic air eliminators from jackets to ensure heat transfer efficiency
- Good mixing is essential to prevent burn-on and promote temperature homogeneity
- Flexible heat ramp rate - 1°C or 2°F per minute is normal
- Highly accurate temperature control - accurate to 0.2°C/0.4°F of set-point

3. Oxygen Control

- Oxygen control is key to flavour stability
- Lipoxygenase activity at mashing has the ability to oxidise lipids/fatty acids to aldehydes, and aldehydes can be very detrimental to the flavour stability of finished beer
- To reduce/eliminate Lipoxygenase effect it is necessary to attack one or more of the following:
 - Ph (should be higher than 5.2)
 - Lipid fatty acid availability
 - Lipoxygenase in malt
 - Acrospire damage in milling
 - Hydration
 - Temperature (should be >62°C/144°F)
 - Oxygen

For a modern lager brewer the most practical control parameter is oxygen elimination.

4. Grist Hydration

Briggs has developed flexible hydration systems to accommodate all mash separation technologies. The mash separation method employed has a significant effect on the hydration system employed. For example, hammer milled grist used with the new generation of mash filters is much finer and denser and is used with a much lower water:grist ratio.